Santa Rita Experimental Range:
Buffelgrass Control in PMC Exclosure

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2006-2007 Activities

Soon after the Tucson Plant Materials Center was established in the 1930s, a 13 ac exclosure on the Santa Rita Experimental Range (SRER) was provided to test plant materials from the Center. The site is conveniently located near Sahuarita, which is approximately 30 miles south of the Center.

The SRER is a research facility established in 1903 to study the effects of grazing and livestock production on semidesert rangelands. It was once administered and managed by the US Forest Service, and in the 80s? management was transferred to the University of Arizona's College of Agriculture. A good working relationship was established between these organizations and the Tucson PMC, and all plantings conducted were a result of collaboration. This plot was used year after year with a variety of different materials, disked, and used again in following years, until the mid-80s. This period was characterized by active interest in "improvement of the range" – be it native or exotic – whatever would establish in these arid grasslands and provide good nutrition to wildlife and cattle.

In 1985 a plot of Buffelgrass (*Cenchrus ciliaris*), an exotic grass from South Africa, was planted in the center of the exclosure as one of 20 accessions of plant materials to be tested. In following years, the Buffelgrass plot, once 8 ft wide by 205 ft long, began to spread. Soon after this planting, use of the plot by the PMC for plantings diminished, but was occasionally monitored. In 2001 it was reported, "Buffelgrass has invaded and taken over most of the center of the site." (Bruce Munda, SRER log book, 1/31/2001)

In successive years a monoculture has covered over half the exclosure as well as beyond the fence line. Buffelgrass has not only spread at this site, but in recent years has noticeably spread across southern Arizona, particularly along roadsides and southern facing hillsides. Meanwhile, the Tucson PMC has changed its purpose from "improvement" of rangelands to "restoration" of rangelands, with exclusive use of native, preferrably local or regional, materials.

2006 Buffelgrass Control

In August 2006, the University of Arizona and the Tucson PMC agreed it was time to contain the buffelgrass infestation in the test plot. In three days of spraying over a period of a month, using a variety of equipment and multiple individuals, the infestation was sprayed. On the first day, the tractor with an 8 ft boom was used for spraying, requiring a driver and two additional people for directing the tractor movement to assure good coverage. 130 gallons of 5% Roundup solution was used to cover

Jace sprays the infestation of Buffelgrass at SRER plot in 2006

approximately 7 ac, the area of densest infestation. The infestation was located with GPS, which was centered in the exclosure, but also spread to nearby washes and roads. For the following two days of work only ATV and backpacks were used to spray the smaller patches.

The first two visits occurred during the monsoon period, when the plants were growing vigorously. By the third visit a month later, the Buffelgrass was yellowing, entering dormancy. The first two days of spraying killed the Buffelgrass but the third visit was inconclusive.

Ramona rejoices at her success two weeks after spraying Buffelgrass (June 2006)

2007 Buffelgrass Control

Early in April 2007, a visit to the SRER revealed two striking observations. The first was color throughout the plot: many native winter forbs were establishing in the plot. It was also clear that the third spray day in September had not likely been as successful as the previous two. Spraying during the height of buffelgrass growth had left the vegetation grey (dead), but spraying following the beginning stages of dormancy only turned many plants a suspicious straw color (not necessarily dead). It was not until the following visit in June, still early in the growing season and too dry to begin spraying, did the yellowed plants reveal life in the form of green leaves.

A patch of straw-colored buffelgrass with a sprig of green life, surrounded by dead buffelgrass (June 2007)

In August, after the summer rains, the first of two spray days took place. This year plot was a verdant green- needle grama (SPP) covered

Needle grama grows densely in the open areas.

the ground in the open areas, feather fingergrass (SP) came up under the shade of trees, and young buffelgrass plants as seedlings covered the same area as it had the previous year. The seedbank of previous years had plenty of seed left to germinate. The treatment plan in this second year was to use the tractor in the same central infestation as last year, as well as the smaller patches surrounding it. The success with the previous tractor work made it clear that as much as could be sprayed with the tractor was preferable. Only the individual plants and small satellite patches outside the fenced plot were sprayed with the ATV. Many flourishing patches of native plants, particularly Arizona cottontop, were avoided. Three (SIZE?) experimental plots for testing a grass-specific herbicide (NAME?) were marked with rebar up against the western-fenceline.

The truck and trailer carrying the tractor were brought to the plot, followed by a truck with four 60 gal drums of water and several containers of Round up, dish soap and blue dye. Once the tractor's water containers were used up they were refilled once [yes?]. The ATV's 30-gal tank was refilled multiple times. A two-person crew drove the ATV, while the tractor required only one person. This year, the plants were smaller and nobody was needed to direct the driver.

In one day the plot – both inside the fence line and out - was covered. The experimental plots were sprayed with the grass-specific herbicide, however expectations were low because the grasses at this point were larger than anticipated. Grass-specific herbicide is more effective on seedlings, less so on mature plants.

Jace sprays the primary infestation with the tractor (above). Leslie sprays a smaller patch with the ATV.

An experimental plot for grass-specific herbicide did not kill the buffelgrass (September 2007).

In September a reconnaissance day was scheduled to visit the results of the previous day's spraying, and to follow up by spraying any missed individual patches or plants. The ATV and several back packs were transported, along with water and chemicals. Few patches needed spraying, however the experimental plots with grass-specific herbicide appeared unaffected. Fears were confirmed that the treatment did not work on the mature plants at that stage of maturity.

The second year of spraying required treatment of a similar acreage as the previous year, but this is to be expected with an invasive plant such as buffelgrass. The seedbed has been establishing for the past 20 years, and the dead plants from 2006 left plenty of space and resources for establishment of seedlings the following year. The second year required less effort however, as the spraying of young plants as opposed to decadent 4 ft tall plants, cut the work by over half. These young plants were not quite young enough to make the grass-specific herbicide effective, however if attempted earlier, at a younger stage of growth, this treatment may be effective. The fact that in the second year feather fingergrass was found under the tree that previously had only buffelgrass was encouragement enough to feel success had been achieved. If greenhouse experiments on buffelgrass seed longevity of 3 years prove correct, then after a following year of spraying, we expect to see a marked decrease in the infestation by 2009.

Ramona displays the feather finger grass in 2007 growing under the mesquite tree sprayed in 2006.